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ABSTRACT

This study examined effects of a Dalton Junior College (Georgia) student success course, Dalton College Studies 101 (DCS 101) since it was first offered in 1987. The course meets twice a week, is strictly elective, and carries institutional credit. All students were first-time students and since most students enroll during the Fall quarter, only these students were studied. The study used student evaluations of the course, analysis of success indicators of retention, average hours attempted, grade point average, hours per quarter taken, and graduation rates as well as variables of verbal and math test scores, sex, and age. Data were gathered from printouts of on-line transcripts analyzed with t-tests and chi-square tests and with correlations and multiple regression. The sample included 405 DCS students and 500 non-DCS students. Among the findings were that at the end of their first year DCS students were progressing more quickly through their program, that DCS students returned at significantly higher rates both after the first quarter and after the first year, that DCS students totalled more hours on average during their tenure, and that 30.8 percent of DCS students met a 90-hour requirement to receive a particular degree standing on graduation while only 19.4 percent of non-DCS students achieved this requirement. (JB)

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# FIVE YEARS OF DCS 101: AN EMPIRICAL ANALYSIS

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The student success course at Dalton College, Dalton College Studies 101, began in Fall 1987 with six sections and 104 students. Since then, the program has grown with the increase in the student body. The course meets twice a week, is strictly elective and carries institutional credit. From the beginning stages of developing DCS 101 it was felt that its effectiveness in enhancing the probability of success in college should be evaluated. This report examines the effects of DCS 101 over the first five years of its existence.

There are several strategies that might be followed when evaluating student success courses. A basic technique is to pass out student evaluations, tabulate the results and consider those results as the course is evaluated. In our student evaluation we ask students to rate us on 40 dependent variables, from the instructor's openness to how helpful a given section of material was. One question that we ask if whether the student would recommend the course to a friend. We invariably get high marks on the student evaluations, including over 90% indicating that they would recommend the course to a friend. We utilize student evaluations to get an overall feeling of how the students perceive the course. However, we have always felt that it was also appropriate to use objective data to further evaluate the program. That is the primary focus of this report.

The dependent variables used in evaluating DCS came from asking what we expected from the course. While we anticipated several benefits to students taking the course, ranging from doing well academically to understanding the value of college to improving personal health, our primary expectation was that students would do better academically and progress in a timely fashion toward a degree. From this, we developed several indicators of success that were used in the analysis including: Fall-to-Fall retention, Fall-to-Following Year retention, average hours attempted and GPA's at the conclusion of the first year of study and in the final quarter of study, hours per quarter taken, and graduation rates.

DCS 101 is offered in all four quarters of the academic year, but since our largest enrollment occurs during fall quarters, we focused on fall quarters for this evaluation. All DCS 101 students enrolled as first time students in fall quarters of 1987 to 1991 were compared to a randomly selected comparison group of non-DCS first quarter enrollees. We had a total of 405 DCS students and 500 non-DCS students in our sample. We gathered a variety of data from printouts of on-line transcripts following the completion of fall quarter, 1993. We analyzed the data in two ways; the more traditional method utilizing t-tests and chi-square tests, as well as with correlations and multiple regression methods. For the last, we focused on the above-mentioned indicators of success as well as several control variables, including verbal and math SAT scores, sex, and age.

## TRADITIONAL ANALYSIS

The more traditional means of analyzing these type of data utilize tests that compare two variables. We began by examining some background variables to see how comparable the DCS group and comparison group were. Our intention here was to examine a variety of variables that might have an impact on whether students succeed in college. For example, if one group had significantly higher SAT scores than the other, we might expect them to do better in school, independent of whether they took DCS. We examined age, sex, and SAT scores. Age and sex variables were equivalent for the two groups. Our DCS students averaged 21.3 years of age, compared with 22.1 years for the non-DCS group; the DCS classes averaged 60.6% female, compared with 59.4% female in the comparison groups. Sat scores were also roughly equivalent. SAT verbal scores averaged 379 for the DCS classes and 386 for the comparison group. SAT math scores were 394 for the DCS students, compared with 399 for the non-DCS groups. All of these comparisons were subjected to t-tests. None of them were significantly different. Finally, we examined the degree objectives in the two groups. We had roughly the same percentage of students intending to

receive AA, AS, AAS, and certificates in the two groups. There was not a significant effect when measured with a chi-square test. All together, these background variables suggest that our DCS and comparison groups were essentially equivalent on these variables that might have an independent impact on success in college.

We next examined several measures that we felt were related to student success. One basic question was how to measure student success at the end of the first year of enrollment. We could not simply run t-tests on the individual GPA's of students, because that does not take into account different numbers of hours attempted by students. We could, however, calculate group GPA's. This has the benefit of being a well-recognize variable, but it is not subject to statistical verification, because you sum quality points of all members of a group and divide that by the sum of the hours attempted by the members of the group, giving you a single number. When we did this, we found the GPA's of the DCS group was 2.11 compared to the non-DCS GPA of 2.16 at the end of the spring quarter of the first year of enrollment. The two variables related to GPA were subjected to statistical analysis. This showed that DCS students attempted significantly more hours than non-DCS students at 24.9 versus 22.2, but their quality points were not significantly different. So, at the end of the first year of study, the only effect that we found of taking the DCS class was that the students were progressing more rapidly through their chosen program of study.

We next examined the impact of DCS on a traditional model of retention, that of students returning to take classes during the fall following their first year of enrollment. We expanded this traditional measure to look at enrollment in the winter and spring quarters of the academic year following first enrollment. We found that DCS students returned at significantly higher rates than non-DCS students using both measures of retention. During the fall following first enrollment, 69.5% of DCS students returned, compared with 55.8% of non-DCS students. During winter and/or spring of the following year, 68.7% of the DCS students returned, compared with 50% of the non-

DCS students. This indicates both a higher retention from year to year, as well as a higher retention of DCS students within the second year of enrollment.

Our final set of traditional measures examined the final status of our DCS versus non-DCS students as of the end of Fall Quarter, 1993. We looked at a variety of final dependent variables concerning our DCS versus non-DCS students. Average GPA's did not vary between the two groups; the DCS students achieved a 2.41 while the non-DCS students received a 2.42 GPA. This is consistent with the final quality points; DCS students averaged 52.6 quality points versus 48.3 for non-DCS students. This is a positive outcome, but not significantly different. There were, however, several signficant differences in our ultimate outcomes; DCS students totalled 56.0 hours on average during their tenure here versus 44.6 hours for non-DCS students. Another important measure that we examined was related to graduation rates. At Dalton College, students must complete 90 academic hours specified in their program of study with a 2.0 average to receive an AA or AS degree. This final measure simply looked at the completion of 90 or more hours with a 2.0 overall GPA. We did not look at graduation per se, because it does not appear on the on-line transcripts. This measure showed a significant chi-square result; 30.8% of the DCS students met the 90 hour criterion as compared with 19.4% of the non-DCS students.

The results of this rather traditional means of analysis suggest that the 5 years of DCS has been fruitful. Students who took the course in the fall quarters of 1987 through 1991 were very similar to the comparison group as measured by age, sex, and SAT scores. Their outcomes, however, were significantly different in a variety of ways. Overall, the DCS students did better.

One problem that we have had in examining the outcomes of DCS was the fact that the students are self-selected. Very few students have to take the course. The assumption that is made, therefore, is that the students who took the course were somehow "better" , or at least different, than those who chose not to. We can attempt to

demonstrate that they are not very different by comparing background variables, as we did above. We can also, however, use a different technique for analyzing the data. That is the topic of the last part of this presentation.

## REGRESSION ANALYSIS

Up to this point, we've only been looking at the relationships between two variables at a time--like DCS and total hours attempted, or DCS and total hours completed, or DCS and whether or not they came back the next Fall.

To do a more complete analysis, and to test more fully for the effects of taking the DCS class, we can utilize a statistical technique that considers other possible effects on the dependent variables we're interested in. In this study we used multiple regression to control for these other possible effects.

The value of multiple regression can be seen in a simple example. Let's say we found that students who took DCS had an average GPA of 2.93, and those that didn't averaged 2.14. Looking at this difference makes it appear that taking DCS had an effect on their GPAs. We could even compute a t-test to show that this is a significant difference. However, let's say that we computed the average SAT scores for the two groups, and the average for the DCS group was 903 and the average for the non-DCS group was 827. Assuming that SAT scores are a valid measure of general academic ability, what this additional information suggests is that the students who took DCS were better prepared to do well in college when they got here. It would cause us to question the positive effect of taking DCS on GPA. Multiple regression allows us to deal with this type of question; it looks at the primary relationship we are interested in testing, and it mathematically controls for the effects of other possible variables, like SAT scores, or anything else that we know, or suspect, will have an effect on the dependent variable. With multiple regression we can control for as many variables at a time that we want.

The basic strategy in multiple regression is to compare the correlation

coefficient between the two variables we're interested in with the regression coefficient for the same two variables. The regression coefficient takes into account the other variables we've designated as control variables.

The control variables used in this study were gender, age and SAT scores. Obviously, there are other variables that affect student success, like motivation level, or even social class, but we had easy access to the chosen variables on the students' permanent records.

We had seven dependent variables, which may seem excessive, but each one deals with something significant and unique in the area of "student success." We will first look at the correlation matrix between all of the variables in the analysis; there are some interesting relationships.

Let's start with the first column--DCS. Taking DCS is coded 1 and not taking DCS is coded 0 for this variable, so the first correlation (.012) means that DCS students tended to be female, but just slightly. With the sample sizes we had, a correlation of plus or minus .10 was significant at the .05 level, so this should help you in interpreting these correlations. The next correlation down shows that DCS students tended to be slightly younger (-.060 means that the higher the DCS, the lower the age). The next two correlations show that the DCS students in our sample tended to have lower SAT scores, on the average. These are important correlations, even though none of them are significant, so keep them in mind--DCS students tended to be younger and have lower SATs, and there was only a slight relationship with gender.

The next seven correlations are between DCS and the seven dependent variables. All of them except the one with GPA are significant, although none of them are especially high. The low correlation with GPA (.004) means that DCS students did not get higher GPAs than non-DCS students (this was also seen in the earlier analysis-- the bar graphs). Quality Points are next. We used this variable because we

believe it to be a better measure of academic success than GPA as it includes both hours attempted and grades. For example, two students have 3.5 GPAs, but one has completed 90 hours and the other one just has10 hours. Obviously the one with 90 hours is doing better over-all, but simply comparing their GPAs doesn't show this.

Gender shows some interesting correlations. Females tended to be older, they had lower SATs in this sample (both math and verbal) and they had higher GPAs and number of Quality Points. So there is a gender effect here. Females got higher grades (and Quality Points) even though they had lower SAT scores.

Looking at the age column, older students had higher verbal SATs, but lower math SATs. Additionally, we see that older students had higher GPAs (the .276 correlation). The .021 correlation between Age and Quality Points indicates thet they had just about as many Quality Points, however, This is because they attempted fewer hours. The -.095 correlation between Age and Hours Attempted shows this.

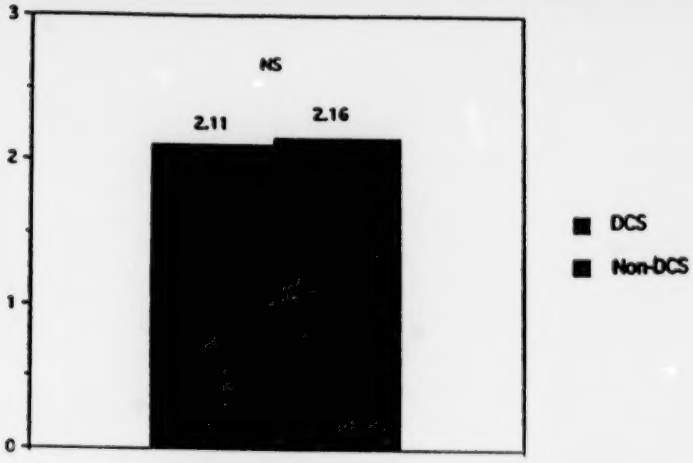
SAT scores generally had high correlations with the seven "success variables, " except for whether or not they came back the next Fall, or the next Winter or Spring Quarters. The other correlations in this table pretty much make sense, but we really don't have time to look at all of them now. The main ones we're interested in are DCS and the control variables we're including, which look promising, although low.

This table shows the correlations between DCS and the seven dependent variables, and the corresponding regression coefficients. Let's look at the first two--Hours Attempted and Hours Completed. For both, we see pretty good correlations, and slightly lower, but significant, regression coefficients. This indicates that DCS continues to have an effect on these measures of "success" even when Gender, Age, and the SAT scores are controlled for. On the far right, the R squares of 11.2% and 12.4% indicate that not much of the total variation in the dependent variables (Hours Attempted and Hours Completed) are being "explained" by the five independent variables (DCS, gender, age, SAT-verbal and SAT-math). The "n" is the number of

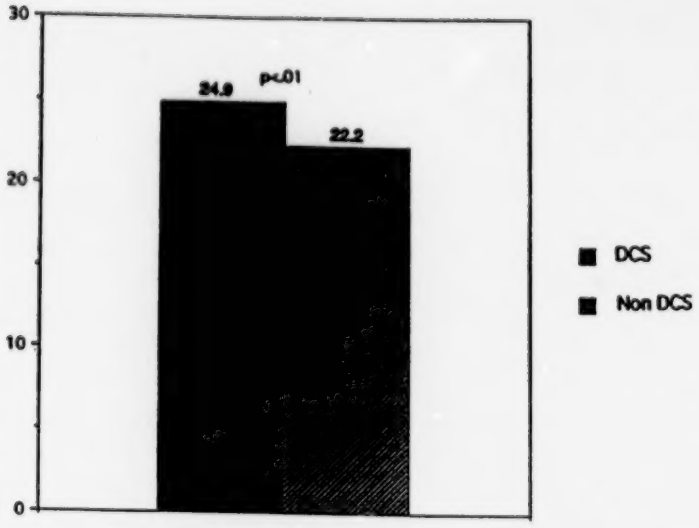
subjects in the analysis.

For GPA, the correlation is very low (.004), and the regression coefficient is not significant (.057). For the remaining dependent variables, the correlations and regression coefficients were low, but significant, with one exception, the "Back-Fall" variable, which was almost significant. Note that the R squares for GPA and Quality Points are the highest; there are low R squares for the two "retention" variables, Back-Fall and Back Winter or Spring, and the R square for "Finish-90" was in the middle. All seven R squares are low, actually, meaning that there are other variables which would explain a lot of the variance in the dependent variables.

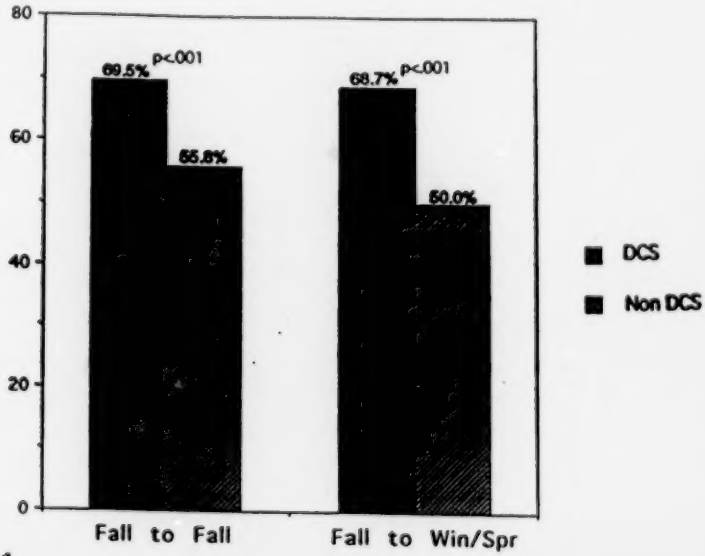
Overall, based on the traditional analysis as well as the regression analysis, we can conclude that taking DCS at Dalton College does have many positive effects. The traditional analysis found that students who took the course in the fall quarters of 1987 through 1991 were very similar to the comparison group as measured by sex, age and SAT scores. Their outcomes, however, were significantly different in a number of ways. While GPA's did not differ either at one year following DCS or overall through their studies, DCS students took more hours in their first year, they returned at higher rates in the fall and winter/spring of the following year, their final number of hours taken was greater, and they had a higher rate of reaching 90 hours. Overall, the DCS students did better. Examining the data using our other technique of multiple regression showed the same positive effect. The regression coefficients for hours attempted, hours completed, quality points, returning fall of the following year, returning winter/spring of the following year, and finishing 90 hours were all significant. We were pleased with the significant results; of course we would have been happy to have had a greater impact, but we have to remember that this class only meets for 20 hours and that many other things affect student success. We also have to remember that many times old habits die hard.



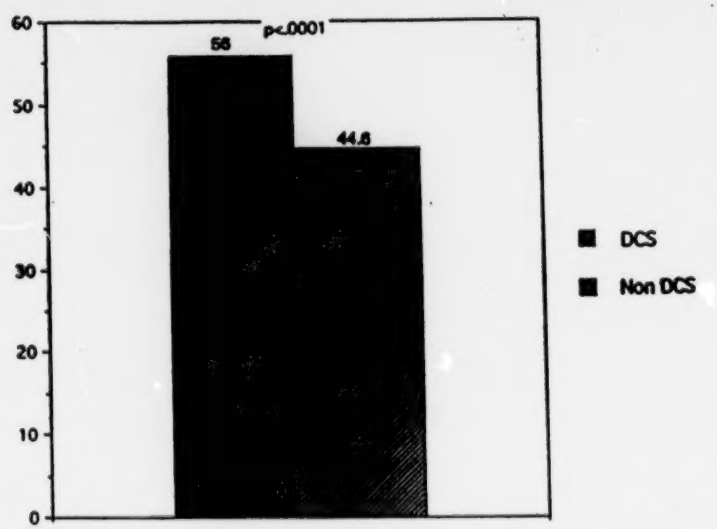

Average GPA at end of first year at Dalton College



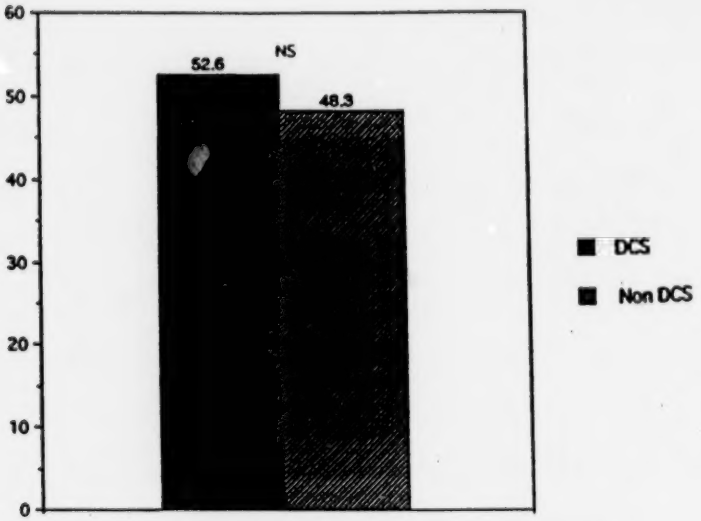

Average hours attempted over first year at Dalton College



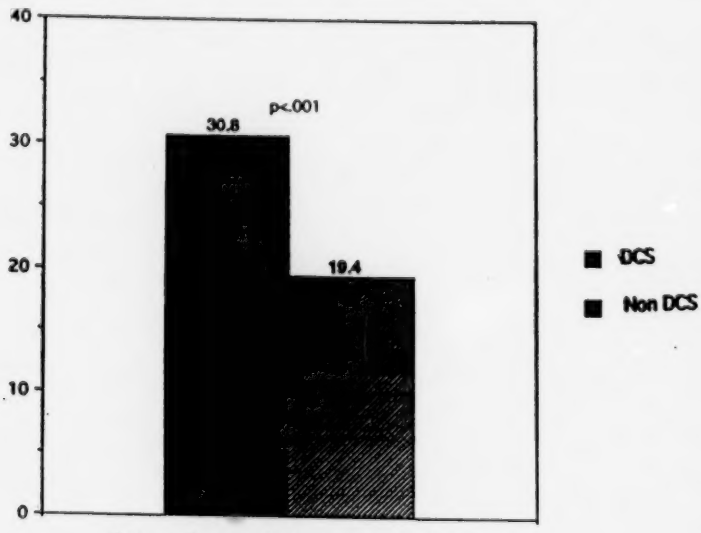

Retention rate




Total hours completed at Dalton College




Average quality points achieved at Dalton College




Rate of completion of 90 hours
(AA and AS only)

## CORRELATION MATRIX

| | DCS | Gender | Age | SAT-Ve... | SAT-m... | Hrs. at... | Hrs. Co... | GPA | QUAL P... | Back-F... | Back-W/S |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **DCS** | 1.000 | | | | | | | | | | |
| **Gender** | 0.012 | 1.000 | | | | | | | | | |
| **Age** | -0.060 | 0.159 | 1.000 | | | | | | | | |
| **SAT-Verbal** | -0.038 | -0.105 | 0.085 | 1.000 | | | | | | | |
| **SAT-math** | -0.030 | -0.193 | -0.199 | 0.534 | 1.000 | | | | | | |
| **Hrs. attempt...** | 0.158 | 0.046 | -0.095 | 0.277 | 0.212 | 1.000 | | | | | |
| **Hrs. Comp.** | 0.147 | 0.065 | -0.057 | 0.289 | 0.226 | 0.981 | 1.000 | | | | |
| **GPA** | 0.004 | 0.112 | 0.276 | 0.322 | 0.275 | 0.380 | 0.484 | 1.000 | | | |
| **QUAL PTS** | 0.128 | 0.081 | 0.021 | 0.344 | 0.262 | 0.921 | 0.951 | 0.629 | 1.000 | | |
| **Back-Fall** | 0.139 | 0.009 | -0.094 | 0.053 | 0.058 | 0.690 | 0.665 | 0.204 | 0.606 | 1.000 | |
| **Back-W/S** | 0.186 | -0.005 | -0.066 | 0.099 | 0.043 | 0.728 | 0.705 | 0.240 | 0.648 | 0.738 | 1.000 |
| **Finish-90** | 0.131 | 0.055 | 0.006 | 0.233 | 0.147 | 0.710 | 0.740 | 0.339 | 0.745 | 0.395 | 0.454 |

# REGRESSION ANALYSIS

| | Correlation with DCS | Regression Coefficient | |
|---|---|---|---|
| **Hours Attempted** | .158* | .130* | $R^2$ = 11.2% n - 619 |
| Hours Completed | .147* | .126* | $R^2$ = 12.4% n = 619 |
| GPA | .004 | .057 | $R^2$ = 17.3% n = 576 |
| Quality Points | .128* | .116* | $R^2$ = 16.5% n = 619 |
| Back Fall | .139* | .099 | $R^2$ = 1.6% n = 619 |
| Back W/S | .186* | .140* | $R^2$ = 3.2% n = 619 |
| Finish-90 | .131* | .111* | $R^2$ = 8.5% n = 619 |

* $p < .05$